

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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LONDON, SATURDAY, JUNE 21, 1879.

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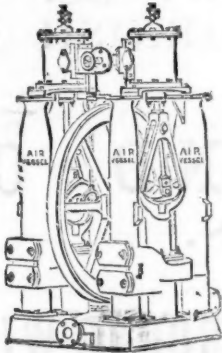
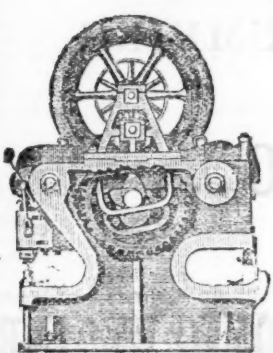
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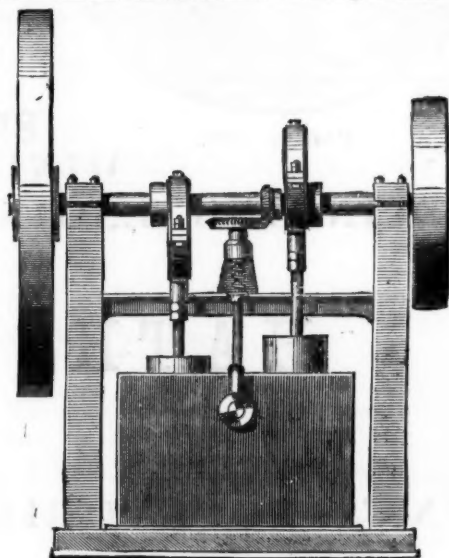
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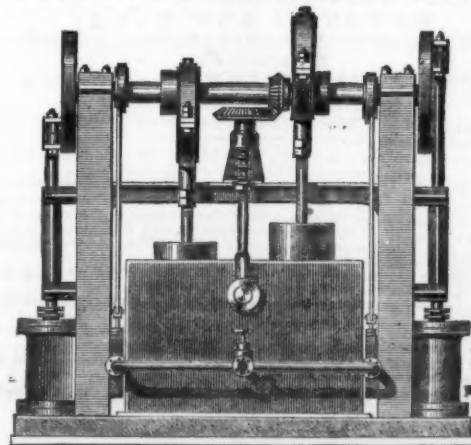
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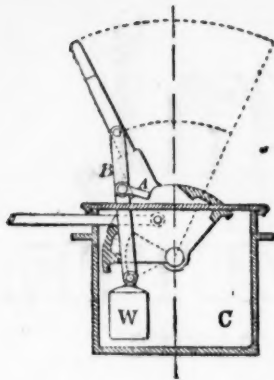
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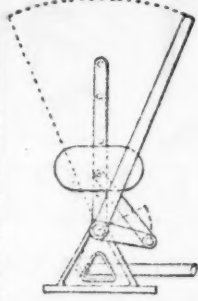
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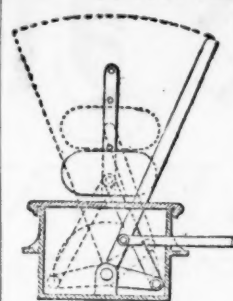
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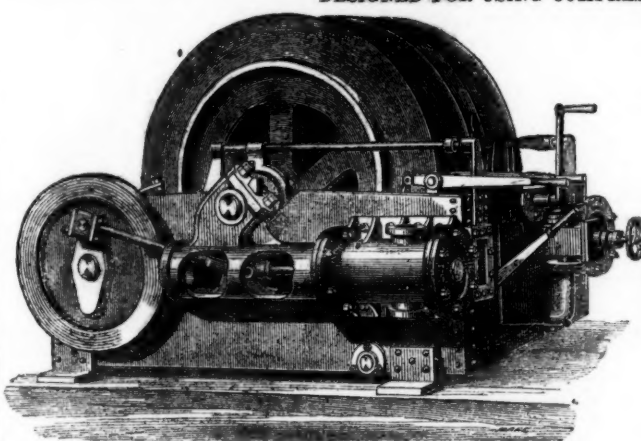
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" THE MONTIPONI SOCIETY, Turin, Italy.

The following letter has recently been received from the Ebbw Vale Company:—

GENTLEMEN,—I have much pleasure in stating that in the execution of your contract to drive, for the Ebbw Vale Steel, Coal, and Iron Company (Limited), a cross measure Drift from the Old Coal to the Rock Vein Coal, in the Glyn Ffith, at Pontycol, you did so with dispatch, and to the entire satisfaction of all concerned. The distance driven was 453 yards in about 13 months.

[The size of the above heading is 9 ft. by 13 ft.]

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Ebbw Vale Works, Monmouthshire, July 5th, 1878.

Yours faithfully,

ROBERT JORDAN, Mining Engineer,

Ebbw Vale Company's Collieries and Mines.

Original Correspondence.

ERIE RAILROAD COMPANY.

SIR,—It frequently happens that shares or stock having different security are quoted at prices which show that either one of them is too high or the other too low in price. At the present time this is the case in Erie. The total amount of the 6 per cent. preference is 1,629,340/., and the ordinary stock 15,420,160/., or rather more than nine times the preference. As it will only take \$500,000, or 100,000/., annually to pay the preference dividend in full, it would be wise to sell the ordinary shares at 28 and buy the preference at 53½. The reasons are simple; the ordinary share capital is upwards of 77 millions of dollars, now if the Erie Railroad earns a profit of 1 per cent. on this capital after paying the mortgage bonds, this 1 per cent. is equal to \$771,008, which suffices to pay the 6 per cent. preference shares in full, whilst the ordinary stock would get ¼ of 1 per cent., or 5s., on every 100/., capital. Your readers will perceive which is the best for a certain rise and a permanent investment. The traffic on the Pennsylvania Railroad is very satisfactory; the net increase for the first four months of this year is \$755,764; the dividend in November will be at the rate of 6 per cent. per annum; the shares at 39½ to 40 would appear a very good purchase for a steady rise in price, especially as the general mortgage (6 per cent.) are now at 116 to 117, and the sterling mortgage at 108½ to 109½.

June 20.

B. E.

ON THE HAULING OF COAL UNDERGROUND—No. IV.

SIR,—The cost of the conveyance of coal will to a great extent depend on the system that is adopted, and the manner in which the roads are laid out from the bottom of the pit inwards. From experiments made by the late Mr. N. Wood it was ascertained that a gradient of 1 in 130 was the most favourable inclination for pit wagons; the tractive force required being the same with empty wagons going inwards on the rise as it would be with the full wagons coming outwards. The gradient of 1 in 144 = ¼ inch to a yard is, perhaps, the more common gradient adopted for underground roads; but the sharper gradient of 1 in 130 has been proved by experiment to give the best results, whether horses or engine power be employed. This point should be duly considered in laying out underground roads; however, if the same gradient is adhered to, it is not often that the roads can be kept uniformly straight. The dip and line of strike frequently change in most collieries, so that practically in using machinery the extra friction of the ropes or chains and the load on curves is a thing requiring the provision of spare engine power.

The cost of hauling coal by horses may be reckoned at 7d. per ton on an average on the total quantity raised in extensive mines. In old mines, with roads of great length, this cost will often be exceeded. In newer mines, where the roads are designed to be of a permanent character, mechanical means of hauling will be anticipated and substituted for horses wherever two or more of the latter are employed. The question will then be, which system of mechanical haulage is to be adopted. This rests very much on the conditions and peculiarities of the coal field. Where the strata lie nearly flat or undulating we find the main and tail rope system much adopted. With a stronger inclination—2 to 3 inches per yard—we find self-acting inclines on the rise; the single-rope system to the dip, and the endless-chain system adopted; the latter self-acting, or assisted by engine power.

The endless rope system may be worked under the same conditions as the endless chain; that is, resting on the top of the wagons, and with or without engine power according to gradient. The endless rope may also be worked by engine power and clip wheels, the rope being attached at the front and back end of the set of wagons, and running on rollers. A judicious selection of one of these systems of conveying coal will greatly facilitate the work, and make the cost lighter. It must be borne in mind that in the endless chain system a wider road and two lines of rails are required. The first cost of this system will thus be greater compared with other systems where only one line of rails is required. The average cost of hauling per ton of coal conveyed has been ascertained to be, on the average of several collieries, by the endless chain system, 1/38d.; by the main and tail rope system, 1/88d.; and by the endless rope system, 2/68d.

The following are particulars of an engine plane worked with main and tail ropes. The engine is placed near the shaft, it has two 12 in. cylinders, 2 ft. stroke, placed 9 ft. apart. The drums are 4½ ft. diameter each, 2 ft. above, placed one before the other, and geared in the ratio of 1 to 2. There is sufficient room for two other drums by the side of these. Engine supplied with steam from two boilers underground, cylindrical, 24 ft. in length, 5½ ft. in diameter. Engine plane is 1900 yards in length; the ropes are 2½ in. in circumference, the main rope being 1900 yards, the tail rope 3800 yards in length. In this length there are eleven variations of gradient, most of them incline outbye. The first from the pit, 1 in 66, rises outwards; second, 1 in 32, falls outwards; third, 1 in 166, rises outwards; fourth, 1 in 603, falls out; fifth, 1 in 207, falls out; sixth, 1 in 57, falls out; seventh, 1 in 600, rises out; eighth, 1 in 30, falls out; ninth, 1 in 50, falls out; tenth, 1 in 148, rises out; eleventh, 1 in 133, falls out. The length of the plane being nearly 1/08 mile is run over inwards in nine minutes, equal to a rate of 7/2 miles per hour; two minutes are taken up in changing at the extremity and at the shaft, the laden wagons are then run outbye in eleven minutes, being at the rate of 5/9 miles per hour nearly.

The gradients varying considerably, as indicated above, the expenditure of power varies similarly. The power of the engine as exerted at various points on the plane having been measured by an indicator, the results are as follows:—1. With 32 empty wagons taken inbye, the weight being 7/2 tons, over the falling gradient of 1 in 166, the average steam pressure indicated was 14/2 lbs. per square inch, after allowing for back pressure; revolutions per minute, 58. The pressure in the boilers being 36 lbs. This gives a total horsepower of 22/6.—2. On the rising gradient of 1 in 30, with the same empty wagons, 32 lbs. pressure in boilers, the average indicated pressure was 25/5 lbs.; revolutions per minute, 74; and force exerted, 61/7-horse power.—3. On the falling gradient of 1 in 30, coming out with 32 laden tubs, total weight of load being 20 tons, the average indicated pressure was 16/8 lbs.; the pressure in boilers, 32 lbs.; revolutions per minute, 100; power indicated, 46-horse power. The brake is used in coming down this incline.—4. On the rising gradient of 1 in 166, coming out with the same weight as last, the average indicated pressure was 28/1 lbs.; pressure in boilers, 36 lbs.; revolutions per minute, 68; power indicated, 52/2-horse power.

It will thus be seen that the greatest exertion of power is on the last mentioned rising gradient of 1 in 166; though the second instance, where the engine hauls the empty wagons up the rising gradient of 1 in 30 nearly equals it, 61/7-horse power being required. To reconcile the difference of horse-power in the four instances with the respective gradients the friction of the ropes and engine must be taken into consideration; accordingly, when the ropes were coupled, and the engine run with ropes only, at 28 revolutions per minute, the average indicated pressure was 17/3 lbs., and power exerted 13/3-horse power. Under the same conditions as the last, but with a speed of 60 revolutions per minute, the average indicated pressure was 15/5 lbs., and indicated power, 25/5-horse power. And when the engine is run alone, the drums being disconnected, the boiler pressure being 36 lbs., the average indicated pressure was 1/9 lbs., with 72 revolutions per minute, the power expended being 5-horse power. We perceive from these experiments that a large part of the total power of the engine is expended over rope friction. In the first case, probably the whole power is expended in this way, with some assistance from gravity. In the second case, more than one-half the engine power would be expended on rope friction. In the third case the engine power would be expended altogether first on rope friction (which would be in a greater proportion owing to the high speed—100 revolutions per minute), and the remainder on brake friction. In the fourth case more than one-half the power exerted would be expended on the friction of the ropes and engine, for the total power being 52/2-horse power at 68 revolutions. The power absorbed by the friction of ropes and engine being 25/5 at 60 revolutions, as stated above, would be 28/8-horse power at 68 revolutions, or 55 per cent. of the whole.

It is desirable, then, in every case to obviate the loss of power absorbed by the friction of ropes as far as that is practicable by bestowing attention on all matters affecting the question, the chief of which are maintaining straight roads, uniform gradients, light ropes and rollers, and other details, so as to maintain the maximum of power to be expended in hauling the load itself, the speed of the latter being influenced not only by the gradients but also by a well-constructed railroad, easy running wagons, and clean roads, all of which have a share in reducing the cost of hauling per ton to the minimum point. The subject of mechanical haulage is far from being fully developed in any of our mines, though it may be adopted in some mines for conveying coal along all the main roads, yet it has not yet invaded the working parts of scarcely one mine, where, though the ways are usually intricate and more difficult to traverse, there is still a probability of mechanical means of hauling being applied to this portion also of coal mines.

M. E.

RAISING OF MOTIVE POWER.

SIR,—The question of raising motive power for the working of mines, especially where coals are expensive, and water scarce, has engaged the attention of engineers and others for a considerable period of time; and in these times of depression it seems that unless something be done to relieve the burden caused by the consumption of coals, or overcome the difficulty caused by the slackness of water during the dry seasons, no large profits from mines so situated can reasonably be expected. Persons visiting the mining districts of North Wales can but notice the large amount of power at hand, were it only laid hold of and made subservient to requirements. There is scarcely a hill or mountain top to be found where there is not an incessant breeze, if not a gale, of wind which, if utilised, would supply the mines with all necessary power, whether in valley or mountain within a radius of a mile or more.

Although the windmill is a very old invention, and may be looked upon as an old-fashioned thing, yet to discard it for that simple reason is an act worthy only of a lunatic. It has been argued that the power is inconstant and unsteady. So would any other power be without a governing agent or medium, and I see no reason why this may not be made as steady as any other power where steadiness is required. Now, there are but few mines in this part which have not some high hill or mountain top within (say) half a mile. If a powerful windmill were erected there with a good air compressor, and a large receiver at some convenient place, the power thus produced would become steady, and could be transmitted to an engine at any distance without any perceptible loss. This seems to me to be superior to the pumping of water, even if there is water at hand, to a water wheel, as the power in this way becomes steady, and can be transmitted to any distance; and should there be a time when the compressed air is too low, and the engine must go on steam, could then be introduced into the same cylinder. I might name mines where steam-engines have been erected that are now suspended on account of the expense of working them with the present price of produce. Now, I can see no reason why those engines, with a slight modification, could not be driven by compressed air from a good windmill, the boilers serving as air receivers.

I think this is a question which might be discussed in the Journal with some good results. The suggestion may seem a novel one, and prejudice may sneer at it, yet nevertheless, if any good should come out of it, I shall feel rewarded for making it. JOHN ROBERTS.

Llewellyn-terrace, Llanrwst, June 13.

UTILISATION OF SULPHIDES.

SIR,—Your admirable Journal is with good reason occupying itself with the new process invented by Mr. Hollway for the treatment of pyrites and other sulphides, and also with the discussions caused by the said experiments and the results obtained. I take the liberty of addressing you to inform you that if the Hollway process is likely to be useful in the Huelva district in Spain, at the mines of the Rio Tinto and Tharsis Companies, and if already in the United States at Salt Lake City and Colorado, and also in Canada, it is about being put into practice, here also in Italy we could apply it with great advantage, especially in the Tuscan Maremma, where copper mines abound, the mineral in which is unfortunately very poor, so that a portion of them are at present abandoned. The ore, although abundant, rarely exceeds 3 per cent. of copper.

There are, for example, the mines of Temperino and Campiglia, where there is a vein of more than 40 metres in size, composed of silicate of iron and alumina, containing iron pyrites, copper, and blende, the mean tenor of this enormous vein being about 1 per cent. of copper, but by a simple hand-picking one could easily arrive at obtaining at little cost a very abundant supply, containing 3 per cent. of copper. This yield is not sufficient for permitting its exportation, and it cannot be treated on the spot for want of fuel. If the Hollway process were put in use in Italy the ores of Temperino could serve advantageously for giving the silica necessary for the formation of the scorie for preventing the corrosion of the walls of the furnace, and contribute at the same time to the enriching of the cupreous matt by the adjunction of the contained copper.

Alongside the Temperino, also at Campiglia, are the mines of Lanzi, Monte Romolo, Acquaviva, and Campo delle Buche, which, like those of Temperino, have been worked by the Etruscans and the Romans, as shown by the numerous and immense excavations still open at this day. All these mines contain poor ores of copper, as also sulphides of lead and zinc, among others at the Cava del Mosbo, where there is a great dyke of argilliferous galena and blende, in an amphibole gangue of such a specific gravity that any washing for the purpose of getting out the metals contained is impossible. All the mineral there could also be quite easily treated by the Hollway process; if not alone, at any rate in the shape of an addition to other minerals. Finally round about all these mines are found immense heaps of ancient scorie, containing among other substances about 2 per cent. of copper and 2 per cent. of lead, this lead itself containing 2 per mille of silver. The scorie also could be utilised by the Hollway process.

Passing from the Campiglia district I would now allude to that of Massa Marittima, so renowned in ancient times as a mining country as to be then called Massa Metallifera, and to have in the middle ages a code of mining laws, with special judges for their application. At this Massa in our time all the mines had been abandoned until some few years since, when, thanks to the constancy and energy of one of those principally interested, M. Schwarzenberg, some of these mines have been re-opened, a good and perfect arrangement for the mechanical washing of the mineral has been put up, and through this a little more life has been given to the district, but the great fall in the price of metals causes this work to be not very advantageous, although they produce annually more than 10,000 tons of mineral. For these mines also, which are composed of pyrites of iron and copper in a gangue of quartz, the Hollway process will be very suitable, and probably help to give again to this district its former industrial prosperity. One immense advantage of these mines of Massa Marittima is that they have there water power of about 100 horses coming from the overflow of the lake Accessa, which would render unnecessary any fuel even for the blowing engines.

If even all the above-named minerals held too much silica—that is to say, did not contain sufficient oxidisable or combustible material—there is at a short distance from the Tuscan continent, on the Island of Giglio, a fine deposit of iron pyrites, containing also copper, a little argilliferous lead, some blende, &c., whence they could get the pyrites rich in sulphur (about 45 per cent.) to assist in the treatment of the above-named minerals.

It would be trespassing on your columns to give an account of all the mines of Italy where this process could be usefully applied. I would mention, however, that on the coast near Sestri Levante are found deposits of iron pyrites, and in the same district there are also copper mines.

Finally, in the valley of Aosta they have for a long time worked copper mines at St. Marcel, at Ollevent, &c. In all these places the mountains contain mines of copper, iron pyrites, lead, &c., and a greater part of these are abandoned because these mountains do not contain fuel, and the ores are not rich enough to bear the expense of exportation. This would all be remedied by the adoption of the

Hollway process, so as to treat the ores economically on the spot, having only to export the rich matts, or perhaps even the purified metals. In this valley of Aosta there are also cupiferous and nickeliferous pyrites.

You will see, Sir, that Italy will also benefit by the success of the Hollway process for the economical treatment of sulphides, and if (as all appears to go to prove) this method should be applicable not only to poor copper ores, but to all sulphides of copper; by the erection of an establishment, for example, in the Tuscan Maremma, the rich copper ores of Monte Catini, which are now at great cost sent to England, might also be treated on the spot.

I hope that you will have the goodness to give these remarks a place in your valuable and largely circulating Journal.

F. BLANCHARD,

Engineer and Director of the Mines of Bottino, near Seravezza, Italy. Seravezza (Bottino), June 10.

DRESSING BY CENTRIFUGAL FORCE.

SIR,—In connection with the utilisation of wind-power in mining operations, I think that a trial might at once be made of it for dressing minerals by that means. There would be this great advantage in making a trial upon dressing to begin with; any irregularity of working would lead to less inconvenience than irregularity in pumping or winding, and upon the wind-engine being got into proper order the wind-power could be generally employed. I do not think there can be much question as to the greater economy of wind-power when the machinery is erected, and I think that in many cases the first cost of the engine would not be more than one-fifth that of a steam-engine; in fact almost everything except one or two light castings could be made by the carpenters and smiths about the mine. And as scarcity of water is an additional reason for utilising the wind, I may take this opportunity of directing your attention to a method of dressing ores based upon the invention of Mr. Eugen Langen, of Cologne, which I think would be very economic. The delicacy of his apparatus may be judged of from the fact that it will separate skim milk from cream, and as the operation is continuous there is much to recommend it.

The materials to be separated must be kept mechanically suspended in water, so that the whole can enter the machine in a liquid state. Centrally within the drum is a tube for the material to enter, and from the lower end of the tube it issues through adjustable orifices into the drum close to the bottom. The tube is slightly larger at the bottom, so that choking is impossible. Round the periphery of the drum are placed a series of removable frame-like receptacles for receiving the separated solid matter, and the top of the drum is closed by a removable cover having a central opening and secured watertight to the upper edge of the drum by screws and caoutchouc packing. The liquid with the solid matter suspended therein being introduced at the upper end of the central tube issues through the small annular orifice at bottom into the drum, where by the action of the centrifugal force the solid matter accumulates in the receptacles at the circumference, while the clear liquid remains in the centre, and in ascending in the drum as fresh liquid enters below, is eventually discharged through the central opening of the cover, the supply being in such regulated quantity that the solid matter is entirely separated from the liquid before this has ascended to the top. This operation is continued until the receptacles are filled with the solid matter, when the cover is removed and the receptacles are taken out and replaced by empty ones. In order to effect an automatic regulation of the discharge of the heavier liquid the before-mentioned side holes may be provided with valves or plugs connected to levers that are acted upon by a float. This float is so weighted that it will sink in the lighter liquid, but rises in the heavier one, so that when the proportion of the heavy liquid in the drum increases, the float will rise and effect the opening of the escape apertures to a greater extent, and vice versa. DEUTZER.

Dantz, June 14.

MOTIVE-POWER ENGINES.

SIR,—Although by no means a believer in perpetual motion, I quite acknowledge that there is much room for improvement in motive-power engines, and these improvements will, in my opinion, come from practical engineers. An ingenious apparatus of this class has been invented by Mr. J. Gfeller, of the Manremont Smelting Works, at Elepeus in Switzerland. Mr. Gfeller, uses a cylinder with an inlet port at one end and an outlet port at the other. Within this there is an inner cylinder having flanges at its ends to revolve in contact with the outer cylinder, and prevent the passage of steam between the inner and the outer cylinders, suitable inlet and outlet ports being arranged at each end of such inner cylinder. A steam space is left at one end between the end of the inner cylinder and the outer cylinder, and a larger space for the exhaust at the other end thereof. A shaft passing through the inner cylinder and connected rigidly thereto passes through stuffing boxes on each end of the outer cylinder. Around this shaft on the interior of the inner cylinder is wound a screw thread, which is made steam tight with the periphery of the inner cylinder and with the shaft, to both of which it is fixed rigidly and with which it revolves. The pitch of this screw thread increases from the inlet to the outlet port—i.e., the threads are comparatively close together at the inlet port, and gradually increase in distance apart to the outlet port to form a proportionately larger space to allow for the expansion of the steam or other fluid. Or the screw thread may be wound around a cone carried by the shaft, and the pitch of such screw may increase from the base of such cone towards the apex thereof, the inner cylinder being made of a conical form to fit such screw thread.

In some cases a volute is employed in the interior of the inner cylinder in lieu of the screw, in which case the leaves of the volute are coiled around the shaft and are attached rigidly thereto; the edges of the coils forming the volute being attached rigidly to and made steam tight with the ends of the inner cylinder, and the coils of this volute gradually approach nearer to each other from the shaft outwards. The steam enters at the periphery of the inner cylinder and outermost coil of the volute and exhausts at the centre thereof. In the case of the volute form of engine and of the cone-shaped form, the threads or leaves of the screw or of the volute may instead of decreasing in pitch or diameter from the shaft outwards, or from the base of the cone to the apex thereof, sometimes increase in pitch or diameter, the steam always being arranged to enter at the narrowest groove, and exhaust at the largest groove formed by the screw threads or by the leaves of the volute.

The operation of the engine will almost be understood without explanation. Steam is introduced at the narrowest point of the groove formed by the screw or volute, and advancing with decreasing speed expands towards the centre, where it escapes by the largest thread or groove. The pressure of the steam is thus exerted against the walls or threads of the screw or volute with a sufficient power of adhesion and propulsion to completely utilise all the working power of steam.

Another motive power engine has been invented by Mr. W. Foulis, of Glasgow. Mr. Foulis's invention relates to that class of engine wherein the motive force is developed by the combustion of gas or hydrocarbon vapours, and it has for its objects—first, to operate such engines by pressure constantly applied throughout or nearly throughout the active stroke of the piston thereof, thereby getting rid of that "negative action" by which certain kinds of gas engines have been hitherto operated; and, secondly, to utilise to a further extent than hitherto the heat developed by the combustion of the gas or hydrocarbon vapour. Several cylinders and pistons may be connected to one crank shaft. One side of each piston is provided with a trunk or with a thick piston rod in order to reduce the capacity of the annular space situated between the trunks or piston rods and the interior of the cylinders. The pistons and cranks are so arranged as to cause one or more of them to approach the termination of its or their acting stroke whilst one or more of the other pistons is or are in or about the position to commence an active stroke. The engines are provided with valves, by preference of a cylindrical form and wherein the ports are so arranged as to admit of the charge of gas at the commencement of each piston's acting stroke, after which the port therein by which such gas is admitted is closed, and another port for admitting compressed and heated air or a mixture of gas

and air is opened simultaneously, with which the charge is ignited and continues to burn gradually. The air or mixture of gas and air so used is drawn into the cylinder during the inactive stroke of the piston, and on that side of the piston on which the gas does not operate, and is compressed on the return, that is to say, acting stroke, at the same time it becomes heated by taking up a portion of the heat developed in the cylinder by the combustion of the gas and air, or mixture of gas and air, during the active stroke of the piston.

The improved valves for admitting at the proper times the charge of gas and air, or mixed gas and air, consist of a cylindrical body which is rotated from the engines, and contained inside a cylindrical casing wherein are the ways or passages leading into the cylinder of the engine. Each valve has in it five ports, three of which are so situated as to admit of the gas and air or mixed gas and air on the acting side of the piston, and to discharge the products of their combustion, the other two ports therein being so placed as to allow of air or mixed gas and air to be drawn in and discharged from the other side of the piston. The air or mixture of gas and air being drawn in during the inactive stroke, the port by which it entered is then closed, and towards the termination of the acting stroke the rotation of the valve opens another port for admitting the compressed air or mixture of gas and air into another cylinder. This valve is or may be made tight by packing round the ports, so as to allow of its expansion on becoming heated.

It is to be understood that the improved valve is not limited in its application to the precise arrangement of engines hereinbefore described, but it may be used in other kinds of gas or combustible vapour engines, and the number of ports then varied according to the arrangement of such engine. In the case of working the engine by hydro-carbon, the liquid is admitted into the cylinders in small quantities by that port of the valve which corresponds to the gas admission port, and is by the heat of the cylinder immediately converted into vapour, or such liquid may be injected thereto.

Liverpool, June 16.

AGENT.

CHONTALES MINING COMPANY.

SIR.—The extraordinary general meeting of the above company taking place on June 27 little time is left for those shareholders who have not taken up their debentures. During the last week between 500*l.* and 600*l.* worth have been applied for, the security on the whole of the property for the 500*l.* asked for is ample, and the interest, 10 per cent., a good return for the investment. When at the office of the company on Tuesday, through the courtesy of Mr. Truran, the secretary, I had the opportunity of a long conversation with an employee lately engaged on our property, who has just returned. I may say, from the information elicited (too long to go into detail), that there is the prospect of the mines making an advance in the right direction. The rainy season would have commenced, the machinery at San Domingo mills is in good working order, the manager is doing his best for the interest of the company, he has made valuable improvements, is securing the mines against heavy floods, he has purchased additional property for the company, and with the ready money remittances, for which the debentures are asked, there is a reasonable expectation of profits. Although the ore for some months has been less productive of gold, by the last report it has recovered to some extent, giving 1 dwt. per ton above that of the preceding month, and although our profit for last month was not more than 4*l.*, if the accounts are looked through since 1873 for the month's working during Easter 4*l.* is the most profit given, whilst as a rule there have been losses. At the meeting I shall oppose the winding-up scheme; any shareholders who may hold the same views as myself, and will be unable to be present, and have not filled up a proxy, I shall be pleased to represent them. On the form they have already received they will have to strike out the name given by running a line through it, and insert above William Ball Palmer, All Saints-lane, Exchange, Bristol, and initial in the margin where the line has been made.

Bristol, June 19.

WILLIAM BALL PALMER.

MINING AT LAKE SUPERIOR.

SIR.—Interest in what is going on in the old home is my excuse for trespassing on your valuable space at this time. I have watched closely, though from a distance, and hence I think the more intelligently, the course of events. At one time it seemed that Cornwall would succumb to the pressure, but the grit and tenacity that has weathered other storms still exist. There has been more willingness to test what the outside world regard as improvements, and there has been a heavier draft on the resources of the mines of the county, and this last has shown that some of them are capable of much more in the way of production than they had credit for. There is now no doubt but that Cornwall will exist as a heavy tin producer, no matter how low the price may rule, and her position will depend more on her people than on her mines.

The *Mining Journal* of May 10 has just come to hand, containing report of Dolcoath Mine meeting, also remarks on the mine from your interesting Cornwall Correspondent. It is quite evident from these that the old mine is as rich as it ever was. I should say is wonderfully rich, richer comparatively than those who own and manage it appear to think. Taking from the report thirteen points (openings) in operation, and the average value exceeds 26*l.* per cubic fathom of ground, or two-thirds of a ton of black tin. Undoubtedly the stopes at work would give a higher average value, for the lode is very wide, 18 ft. in some places, and the better portions are available without having recourse to low-quality ground in these depressed times. I estimate that a cubic fathom of ground broken will yield about 18 tons of tinstuff, worth, in round numbers, as per report, 1*l.* 10*s.* per ton, or much more than the quartz of many a dividend paying gold mine. There is only one copper mine at work on Lake Superior whose rock will average worth 5*s.* or 1*l.* sterling per ton. The Calumet Mine affords rock worth 15*s.* per ton, or just double that of Dolcoath, and earns as profit 350,000*l.* per year. Dolcoath sold for three months 14,301*l.* 1*s.* 6*d.* worth of tin, or the product of 550 fms. of ground, at 26*l.* per fathom. For one month 183½ fms., or 3300 tons of rock, were treated, or less than 40,000 tons for a year's work. These may look like big figures to talk over after dinner, but after all they are not very imposing. What would the large iron and coal mines of the North of England think of an annual output of 40,000 tons, and what could they make in the shape of profits from such a quantity.

I anticipate the reply that hoisting is a very serious matter from the depth that Dolcoath has attained, so it is from any deep mine, from the collieries, from the Comstock Mines, and from many others which approximate closely to Dolcoath in depth. Dolcoath is not confined to one shaft or one hoisting engine, and Cornwall was as famous for its engineers as it was for its miners. If the mine has not machinery equal to the best it ought to have it. It has been paying regular dividends for many years, and the company have not been left in doubt as to the future of the mine, and the prospect of being recompensed for any outlay they might make to secure an improved condition of things. Periodically the world has been informed that Dolcoath looks better than ever in the bottom, and yet now when the mine is 352 fms. deep under the adit, the point is made that "during the next twelve weeks they intend putting in a new skip-road." A very good thing to do, but it is strange to see where credit for what has been done comes in, when there is a shaft in a rich mine nearly 400 fms. deep without a skip-road.

The more sanguine of the Cornish people have been flattering themselves regarding the falling off in the tin supply from the colonies. This may help to keep up courage and divert the mind of the man who does not think very much, but will not be found to be the remedy. The reports published in the *Journal* a few weeks ago show that tin can be mined in the colonies, even at the lowest price touched, at a handsome profit. It should be borne in mind that Australia is as yet an unexplored continent. The high prices attainable a few years ago led to the opening of colonial tin mines, and whenever the price will warrant further exploration the work will be undertaken, and further discoveries will be made.

Cheap tin will give to Cornwall the best chance to lead the world in production of that metal. How to produce cheaply is the question. An increased production would materially reduce the standing or prices in many mines. Pumping, for instance, costs no more for

50 tons per month than for 20 tons, and many other expenses may be reckoned in the same way; and here, I submit, is the strong point to be made in Cornish tin mines. Dolcoath, with a lode 18 ft. wide, growing richer as it descends, is only limited in production by the rate of deepening the mine. A block 60 fms. long, 12 fms. high, and the width given above, affords more rock than the mine handles in a year, and more tin, if worth 60*l.* per fathom, than is returned in two years. Then look at the flat lode recently cut at South Frances, 18 ft. wide, and worth 5 per cent. for black tin, and the probabilities in favour of the same lode being found rich in other properties that it runs through. I cannot conceive of anything that can compete with this, unless it may be a lucky strike in a gold or silver mine. Push the mines for all they are worth, in spite of the price of tin, nothing more sure than that the weakest goes first to the wall, and for certain it need not be Cornwall if there is a fair deal all round.

The dues question, too, is a matter for discussion; dues on profits are fair, but the "pound of flesh" to come out of a mine that is working for the benefit of all the community, the shareholders excepted, is an exaction that will drive capital from the home mines. Following up this subject further at present might be unpleasant; and finding fault with Dolcoath results may be gratuitous; the writer has no personal interest in either subject, but they both afford thinking matter for the mining men of Cornwall. Before closing I should like to notice the prospectus of the Missouri, U.S. Lead Mine, but fear to trespass on your space at present.

Calumet, Mich., U.S.A., June 2.

J. D.

NEW QUEBRADA COMPANY.

SIR.—The report of the above company is satisfactory as far as it proves what a valuable property we have, as ore-bearing ground is found wherever new levels are made; but I ask the shareholders to consider two or three points in the report, so that they may be prepared to assist some large shareholders in steps they propose to take at the next meeting to press for more energetic management, as the three directors who are in favour of so doing are outweighed by the others who wish matters to take their course. Two years ago Mr. Darlington strongly impressed the necessity of reduction; each meeting we are told "the directors are giving serious attention to this matter," and experimenting. The Rio Tinto and Tharsis Companies make large profits out of 2 or 3 per cent. ore, why do our directors consider, and not act? To the mines the shareholders of both this company and the railway look for a return on the large amount of capital expended, which amounts to a million pounds sterling, and yet our directors have only spent in the half year 5000*l.* for getting out 6000 tons of ore that have been sold. Drivages, stoping, and exploration. Five thousand pounds to get a return on a million! It is most dispiriting, if not unjust, as showing the inability of our management.

A LARGE SHAREHOLDER.

THARSIS COMPANY—HASELDEN AND GOSSE'S ACTION.

SIR.—The Tharsis directors in their report give the following extract from the judgment by the French Tribunal:—"Seeing that the sum promised has been paid; that the issues have been subjected to the decisions of the general meetings; that the 'apporteurs' have received the *pro rata* coming to them on the issues made; that they have, therefore, nothing they can now claim under this head; that if, instead of having recourse to other issues, the general meeting has preferred on the report of the Gerant to authorise him to lease the mine in lieu of the direct working thereof, this meeting at which the apporteurs were present, or could have been present, has in nothing exceeded its powers; that the documents produced establish the fact that it acted on a well-understood common interest; that this decision, besides, does not destroy the equilibrium of the rights of the apporteurs and of the other shareholders; that it is advantageous as well to the one as to the other; that Gosse and the heirs of Haselden, one of the founders of the Company of the Copper Mines of Huéla, have not, therefore, sustained any prejudice, and have, consequently, no ground for their demand, which must be rejected."

I wish the directors had told us the meaning of this judgment. It seems to recognise Haselden and Gosse as still having an interest in the Huéla Company along with "the other shareholders," and the "equilibrium of their rights" was not destroyed by the lease to the Tharsis Company, but after all that "they have no ground for their demand." Now, what was this demand? It is clear it was not a demand in the character of shareholders; perhaps it was their demand to have their contract with the Huéla Company rescinded and the mine restored to them. If so, they have lost their action, as I expected they would, but it is plain they have other claims yet. What are they? Is it for delivery of the shares in the Huéla Company they say they ought to have got, or what is it?

On the whole I would like to hear Haselden and Gosse. They volunteered to your *Journal* an account of their action. They were naturally indignant when I hinted that the directors considered it a bogus action. But since then they have been absolutely silent. I invite them to speak out, and I think in justice to your *Journal* you should insist on it.

A LAWYER.

THE CAPE COPPER MINING COMPANY.

SIR.—It is satisfactory to note amidst the depression in the mining world the very encouraging report of this most important concern, which actually even now divides a 3*l.* dividend amongst its fortunate shareholders, whilst making large provision for its railway sinking fund, now amounting to close upon one-half of its cost. The directors are prudently not forcing the output, nor have they any need to do so, having no debentures to provide for, as in the case of most such companies. There can be no doubt, however, that with their large reserves in the mine they could, if they so chose, materially increase their shipments, and thereby add to the dividends. In paying away the first two quarterly dividends of 17*s.* 6*d.* each they did not anticipate the fall in copper which obliged them to come down to 12*s.* 6*d.*, but we may confidently expect that even at the present low price of copper they will be able in September to resume quarterly dividends of 15*s.*, which their accounts clearly show. A company which can show such results with the unit at 11*s.*, represents "a potentiality of wealth," such as in copper mines is seldom if ever met with. We shareholders must long for the good old times of 15*s.* to 20*s.* the unit, and as production is now much restricted they may yet be before us. Meanwhile 10 or 11 per cent. is not a bad return for money at a time when anything at all good is yielding a bare 4 per cent.—London, June 18.

W. W.

LEAD MINING PROSPECTS IN SCOTLAND.

SIR.—A week or two since I made the remark to you that the secretary of a mining company played many parts from the birth to the burial of a mine. I might have added that the chairman is no exception. Look, for instance, at the chairman at the Leadhills meeting last week. In the *Journal* of May 10 he, as a director of a company, tells your readers that if they will only invest 1*l.* on allotment and 9*l.* afterwards they will become part owners of a lead mine which, taking even the present exceptionally low price of lead, will pay nearly 30 per cent. Again, on the 17th the same story is repeated—"virgin forest," "good boiler," "freedom from income tax," and all. Last week the scene is changed. He comes nearer home—he has to meet the Leadhills shareholders, who want to hear of a dividend. There is none to give them, but he comes up smiling, and explains to them that this is not a meeting for declaring a dividend—it is a board meeting—but he is glad to meet them. He does not want to preach, "although there are many things I should like to dilate upon." He gets poetical. "The sun is shining outside," I suppose for much the same reason as the stars, "because they're nothing else to do." Be that as it may, the sun is shining outside, and he says they must not expect everything to be shining like the sun, for the mining world is blackness itself, and unless lead rises in price there is little hope of a dividend. Do they want to know anything? He has, I presume, brought down Captain Waters from that "great mountain whose apex can be seen from the Minera district." At all events, he has brought him "up here."

Wound him up, and like that great oracle—Capt. Bunsby—he said—"That was his opinion, but he did not wish to be bound for it." I think this is the gist of what the captain said. The Chairman, however, continued to hold on cheerfully; "he did not really know another lead mine which was looking so promising and so well for the future as this great mine," &c.

Now, Mr. Peter Watson is no fool, but how he can reconcile the directors' statement of the Missouri Mine and the present look-out for the Leadhills shareholders is more than I can see. What the shareholders want to know is the real state of the company—the value they have for their money. The mine is a leasehold for a limited term of years. How many? They require by the lease to have a certain percentage of the men sinking or driving; the levels must be at certain intervals and a certain size; the lordship is one-seventh. They have not a house, I suspect. What is the value of the property which they will be able to remove at the end of the lease? Did the company get a lease in their own name, or does the owner—the Earl of Hopetoun—still hold the original company responsible? It is plain that the real value of the place is a very small figure over the price of the old materials at the end of the lease, which would certainly be much under 10,000*l.* Would a committee of investigation be a good thing to go into the matter from the beginning?

AN ENGINEER.

CRANSTON'S ROCK DRILLS.

SIR.—I beg to correct an error in your remarks on Cranston's Rock Drills in last week's *Journal*. The 300,000 cubic yards of trap rock has not yet been removed from the James Watts Dock, but by the aid of Cranston's drills is at present being rapidly removed.—Newcastle-on-Tyne, June 19.

J. G. CRANSTON.

PYRITES.

SIR.—As there have been several communications in the *Journal* on this subject—Mr. Charles King's, Fieri Facias, and others, referring to Mr. Hollway's process of reducing ores by means of sulphur-pyrites, there can be no doubt but a very important question is raised thereby, and if it is satisfactorily solved many mines now working at a loss, and others that have ceased to work, may be re-suscitated, and made to pay good profits. The immense quantity now imported from Spain, Portugal, Norway, &c., shows what a large trade is carried on even now for chemical manure and other works, but if our home produce can be utilised under this process, and the other minerals associated with the pyrites be saved and converted into metal, this large supply from abroad would not increase, as the home product would meet the demand of an ever increasing trade. Should any of the sulphuric acid, chemical, or other manufacturing works wish to make experiments on English pyrites, I can furnish them with samples that will yield in bulk 52½ per cent. sulphur, and can supply in quantity f.o.b. Plymouth at a moderate price.—Plymouth, June 19.

J. HODGE.

ROCHE FELSPAR WORKS.

SIR.—I was exceedingly gratified after having read the letter of a Shareholder in the Supplement of last week's *Journal* in reference to the above-named works, and I can fully endorse his sentiments as to the importance of the recent discovery of spar in the new drift. Having a little spare time, I visited the works yesterday afternoon, and was agreeably surprised to see tram-load after tram-load of magnificent spar that the men were tramping to the floors, awaiting only to be picked and arranged a little, and then shipped at the port of Fowey for the Continent. The spar in the drift seems to be superior to that which the company are at present sending away, and that I am informed assays 99.90 per cent. Perhaps some one connected with the works would give a detailed analysis of the spar. The works have been rapidly pushed on, and reflect great credit on the resident manager (Captain Thompson), and the gentleman who was the means of starting this new industry, and who has been working night and day so as to bring it to a grand success, which I feel assured it cannot fail to be. The works have only been in operation for about eight months, and near 1000 tons of spar has been shipped for the Continent, and in that time an engine has been erected, tram-roads laid into the quarry, dressing and picking floors laid out, powder and picking house erected, which speaks volumes. The manager informed me that they had an overwhelming demand for the spar; in fact, he said they cannot execute all their orders in time, so that there is no fear of having large stocks in hand. There is everything requisite on the works for the carrying on of an extensive and lucrative business. I am assured that a limited company is being formed for the carrying on of these works in connection with china clay, as by the amalgamation of the two the refuse of the spar and china clay will make the best of brick, and the consumers of felspar are also buyers of china clay; and by working the felspar in conjunction with china clay larger profits are obtained.

In conclusion, I beg to say I consider that this is one of the best investments that the county of Cornwall can at present produce, and I feel assured that the lucky shareholders will shortly reap a rich and lasting harvest. I will shortly send you a detailed account of the works and its surroundings.

June 19.

OCCASIONAL CORRESPONDENT.

DUES PAID ON LEAD ORES IN DERBYSHIRE.

SIR.—The time has fully come when a large reduction or a total extinction of these heavy dues paid on lead mining in the High Peak of Derbyshire should take place, and the attention of the lords of the dues and tithes again be directed to the subject, and a combined effort on the part of the directors and shareholders in the large mining companies, also the owners of the lesser mines, and powerfully backed up by the weight and influence of the labouring mining population of that extensive district. The effect of such a movement would soon be felt in the proper quarter, and with a fair chance of such a concession being made as would at once tend to relieve the panic and prevailing distress in this large commercial interest in that particular part of the country. The occupation of lead mining and smelting is of great antiquity, and has continued to employ the greater portion of the population to the present day; and the steady contentedness of these people, with their frugal habits and industry, has long been proverbial. This happy state of things has for some years become disturbed more and more each year by the decreased earnings of the miners, from two causes—1. The long-continued fall in the market value of lead; and 2. The heavy dues and tithes paid on the ores raised. For the first of these causes there is no immediate remedy, the depression being brought about by continued bad trade, and the heavy imports of foreign lead disturbing the balance of supply and demand; but for the second of these causes a most effectual remedy is at hand, and if the lords of the dues and tithes would look two evils in the face, and choose the lesser, they would again give tone and spirit to this industry, and find the many hundreds of men now entirely out of work, and without any resource, steady and continued employment. In this way—when all the mines are closed in consequence of continued loss by working them, these lords get no dues whatever, and they might just as well choose the lesser evil, and strike off the entire of the dues and tithes until lead reaches 18*l.* or 20*l.* per ton, and thus set at liberty this industry, which is now speedily dying out. In the one case they get no dues, and all shut up, and dire distress on all hands. In the other they would still get no returns, but the distress would cease, and employment would follow, which must be the far lesser evil of the two.

Had such a wise course been adopted in 1874-5, when the value of lead fell so rapidly, and at which time such a united effort was put forth in this direction, and the large memorial, signed by all the miners of the district, also owners upwards of 1000, and which still lies with his Grace at Chatsworth, the long and profitless struggle for four years past, and continued loss, and at last the closing of the mines right and left, would all have been prevented, for a most excellent spirit prevailed between employers and employed, and mutual concessions were time after time made, until it was clear continued loss would result to both, and no prospect of concession from the lords. Closing the mines was the result. This has been

done on so large a scale that the poverty and distress of the district is now greater than I ever knew it beforetime, and quite likely to continue. It cannot be contended that such an extinction of dues or concessions on the part of the lords is a most unusual thing to do, when it is well known that such a step is frequently taken in various parts of the mining districts of this country. In my next letter I shall give your readers the dates, places, names of lords, and extent of reduction in such cases where loss is made.

Why the lords of the dues and the tithe-owners have held so tight a hand upon these dues, without the slightest remission or concession, when they clearly saw that ruin on a large scale would soon prevail, I am at a loss to explain, for the business was most clearly laid before them, and discussed with all calmness, by a deputation of practical miners and mine agents with the Duke, at Chatsworth, on Dec. 13, 1872, when, after an interview of two hours, his Grace said that he could not give his answer then, but would consider the matter carefully over, and let them know his decision, and, strange to say, although 64 years have now passed over, no such promise has been kept, and to this day the lord's dues remain as before time—1-20th and the tithes 1-40th, and the cope grain of 4d. per load of nine dishes of 15 pints, such dish weighing on an average 60 lbs. Thus are these unremitted dues still contributing to crush the vitals out of the mining industry of North Derbyshire.

Parker's-road, Sheffield, June 16.

HORATIO BRADWELL.

MINING IN LLANARMON.

SIR,—The Westminster Lead Mines have probably been the richest and most productive in Wales, and acquired during their former working a wide-spread celebrity for the enormous yield of lead ore, and only during the latter period of their working been equalled by the Minera Mines, which they resemble in all geological points and formation. The lodes traverse the two well-known sets of bearing measures for two miles, which are then capped by the millstone grit, and the thickness may be taken as between 300 and 400 yards. A large extent of the ore-bearing measures still remain undeveloped, and are under water, but these same conditions may be dealt with as they were at Minera on re-starting in 1849, by bringing up the deep adit level, which is already driven 700 yards, and only requires it extended to unwater the numerous runs of ore known to exist that can be taken away at a good profit even at the present low prices. The eastern workings have not yet reached the first set of bearing measures, and consequently have the two sets to develop, whilst the western workings have only partially developed the lower set, and as the ore was stoped away underneath it testifies the ground was rich, and left off so. From the foregoing it will be seen that a very high opinion is held of these mines, founded on geological evidence and natural facts, and that when opened out large profits are fully expected to be the result. AN OLD MINER.

THE CORNISH MINER AT HOME AND ABROAD.

SIR,—A few remarks of mine appeared in your valuable Journal of Sept. 23, under this heading, and I presume this subject was well understood as being introduced in the first place as a question—"Can the Cornish miner be induced to work so hard at home as he does abroad?" In those remarks I tried to explain the course to be pursued to arrive at a successful result. While I am sure there is no other class of miners more willing nor more able in metallic mining under proper treatment than Cornishmen, I think that to expect more work for the same amount of pay as has been ruling in Cornwall of late is altogether out of the question.

Even to take Capt. Abraham James's statement, miners getting to work at 8 o'clock in the morning, and quit at noon, coupled with the meagre subsistence allowed them and the very limited amount of air allowed them in their work, is actually more than they can stand, as I have always understood the average age of a Cornish miner at home is only 30 years, while here, on Lake Superior (America), we have them of all ages up to and over 60 years going down in our deepest mines daily, and facing the hardest kind of work and enjoying themselves cheerfully.

To show up the position of a Cornish miner at home in Cornwall it is only necessary to glance at the wages allowed him and the high prices he has to pay for provisions, house rent, fuel, &c., when the matter is much easier imagined than described; and, in doing so, we should consider that Cornish miners must be considered as summed up in the following manner:—

In one position we notice a number working on so-called contracts or monthly wages, averaging may be about 2l. 5s. per month, some working for 1l. 10s., and up so high, perhaps, as 2l. 15s., while there is another lot of men on tribute, and amongst the whole of them undoubtedly there may be a very few who earn good wages while the main bulk go to the office on pay-day begging for a few shillings to take home to their families, not having had one enough to give them any pay according to their agreement with the agent of the mine. Amongst this number some are loaned from 5s. to 10s., 15s., and so high as 20s. each, while there are many who are plainly denied, and wretchedly abused and ordered out of the office simply for asking for a few shillings. Therefore, to average the wages of Cornish miners in their own country I leave with your many readers to comprehend. Facts are said to be stubborn things, but figures will plainly show whether I am right or wrong.

I see through your valuable Journal that mining companies are objecting to miners having the first Monday in the month as an idle day (Maze Monday) as so called. If men are hired to work at a fixed amount of wages per month, and to work the 26 days for that, of course it is not right the men should be allowed Maze Monday; but if agents would throw aside that wretched system of compromising, allowing men to get only just so much whether they work hard or easy, and introduce the only true principle of work—long contracts—and have it known far and near that each and every man must expect to abide by his contract, and that no one contract shall be influenced by another, men would very soon forget Maze Monday and every other bad habit they might have been indulging in, when mining companies would quickly discover the importance of the changed system in work to their astonishing advantage, and their men going to and from their homes and work cheerfully, and well able to keep the wolf and every other trouble from their doors.

Some time since—I believe it was at a meeting of South Wheal Frances—a gentleman asked the question whether Cornish miners could be induced to work so hard at home as they do in America, and thereby get more wages? Whoever that gentleman was he only received a very childish answer, while the question was one opening up the very trouble now existing between the mining companies and the miners in Cornwall, and should have had an exhaustive answer; and Capt. Josiah Thomas, who seemed to have been present at the time, was fully able to, and being a man of great influence in that direction should have given an exhaustive answer. To draw a comparison between the Cornish miner working in Cornwall and the Cornish miners working here in America I beg to show you the following figures, which are as near as I can comprehend reliable; but, in doing so, please understand I do not include those on tribute nor those out of employment in Cornwall to get at the average work, but simply look at those employed on so-called contracts, and also look at those employed here by contracts. For instance, we will take a drift by four men in each country, allowing the two drifts to be precisely of the same kind of rock in every respect, and the four Cornishmen in each country to be of the same ability and disposition in every respect; by doing so the subjoined is the result which will be obtained for making a comparison:—

By drifting in Cornwall, 14 ft., at 6d. per fathom ...	£14 0 0
To candles, fuse, powder, and smith's cost (say) ...	4 0 0
Distribution (four) ...	£10 0 0
Amount of each man's wages one month ...	2 10 0
By drifting on Lake Superior, 20 ft., at \$7-50 ...	\$150 00
To candles, fuse, powder, and smith's cost (say) ...	20 00
Distribution (four) ...	\$130 00
Amount of each man's wages one month ...	32 50

The above is about what I consider is performed both here and

in Cornwall—i.e., the comparison holds good; but to get miners to drift 20 ft. in Cornwall it is, as I have written you before, men must be allowed more wages than they are now getting to allow them better board, and the mines must be better ventilated. The latter, however, can be done by machinery, and at a very trifling expense. Now, if the miners be allowed better wages, and the mines be ventilated, I cannot see why they should not accomplish the same amount of labour in Cornwall as they do here. Then say—

Drifting, 20 ft., at 6d. per fathom ...	£20 0 0
To candles, fuse, powder, and smith's cost (say) ...	4 10 0

Distribution (four) ...	£15 10 0
Wages per man per month ...	3 17 6

Thereby showing an additional amount of wages to the miner of 1l. 7s. 6d. per month. But to do the square thing, that the new system of work should be so equally encouraging to the company as to the miner, and to do so we will take off 1l. per fm., as follows—4 men drifting 3 2 6ths fathoms, at 5d. per fathom... £16 13 4

To candles, fuse, powder, and smith's cost (say) ...	4 10 0
Distribution ...	£12 3 4
Wages per man per month ...	3 0 10

By this it would give both the company and men considerable encouragement—the miners would receive one-sixth additional pay, and the company save one-sixth in that expense.

Ontonagon, Michigan, May 27.

A MINER.

THE LLANRWST DISTRICT.

SIR,—Your North Wales Correspondent seems still to have a little too much animus lurking within, especially if he is also the author of the paragraph under the above heading in last Saturday's Journal. It would be a very difficult matter to decide as to which is the greater evil—the writing up of mines or writing down. Were they to receive equal condemnation your correspondent in question would be as guilty as those he condemns, and justly merit equal punishment. I will not pretend to sit in judgment on these questions, but one cannot help thinking that the spirit of the latter savours too much of malice, and hence far more objectionable. It would be very interesting to know who the "greatest mining authority" in England is. As there are so many great authorities the greatest must be very great, and would not object to having his name mentioned in the columns of your wide-spread Journal. But this, too, would be a very difficult question to settle, as it remains a matter of opinion, much more so than the former, as no rules of logic can decide it.

Can your correspondent or correspondents name a district which has sold so much lead with the same amount of capital spent as this has done? Why have known single mines in Cornwall to spend more money monthly than is spent in the whole of this district without any good results, and yet not one tenth as much has been said about it. And why? Simply because Cornwall had established a world-wide reputation, and, perhaps, such mines themselves had at one time been very rich, and people expected to find the history of the mines would repeat itself, notwithstanding the old men had left nothing behind but old "stulls" and arches of "dead ground." Let the same amount of energy and endurance be exercised here as there, and there cannot be much doubt the same results will follow. Let any unprejudiced mining authority examine closely all the characteristics of the district, the formation, the lodes, &c., with effects of the former workers, and he must be convinced there is no district which bids fairer for establishing a lasting reputation. Take the lodes—for number, size, and general appearance they are equal to the lodes in any district in Cornwall. But not one of them have been seen more than 40 fathoms below surface—just at the point where the Cornish mines begin to be most productive. And who can tell but what when these mines are followed down to a greater depth they will prove equally productive. It has been stated over and over again that the ore is merely in shallow deposits, and that it "does not hold down." This is a question which remains yet to be proved, as did the Llanidloes district prior to the discovery of the Van Mine. It is well known that until that time people said no bunches of lead there "held down," and when the present company, or the promoters of it, bought the mine it was very much feared the lead would not be found in the then next level below. These fears were expressed by one whom some call (and certainly he considers himself) the best and greatest authority at Llanidloes. But what was the result? And who doubts now that the lead in the Llanidloes district "holds down?"

The formation has been spoken of in comparison with the limestone, the parties endeavouring to make people believe that lead is not to be found in the Silurian formation in paying quantities. So much for the experience of our greatest authorities (?). It is well known by all experienced miners that courses of lead are far more to be depended upon in the Silurian formation than in the limestone, and I have no question that your correspondent will grin to a fearful extent to see D'Eresby Mountain and Pant-y-Mwyn placed side by side a few years hence, and their results compared. The former, even should it not return half the amount of lead, will give double the amount of profits that the latter can do. D'Eresby Mountain is an adit mine, and can be worked as such, if thought proper to do so, for many years to come. All the requisite plant is erected and paid for. Pant-y-mwyn has to spend 12,000l. in the erection of adequate machinery, and then to support it at the rate, perhaps, of 2000l. a year, or even more than that. So even at the present moment D'Eresby Mountain stands in a far better position than Pant-y-Mwyn, and I have not much doubt that the former will flourish when the latter will be completely drowned.—June 17.

CYMRU.

CORNISH MINING, AND CORNISH MINERS.

SIR,—Surely, Mr. Editor, there must be an end to the shrinking of prices, as there was an end to the expansion of prices over the years 1871-2-3. Seven years ago—1872—Carn Brea gave dividends of 15,500l. Tin at that date was over 150l. a ton. It is now 67l. a ton. Calls have since been made of 21,375l., and a debit balance of 19,233l. stands against the shareholders. The value of the mine is now 25l. to 27l. a share; in 1872 it stood at 160, 170, 180 a share—a depreciation of 155,000l. during the interim. The mine is being developed by boring machinery, and the yield is far in excess of that realised in 1872. From the close of the Franco-German war there arose generally great prosperity in nearly all branches of iron, copper, tin, and metallic engineering, hardware, cutlery, and shipbuilding trades. The revival began immediately upon the conclusion of peace, and received its first stimulus from the re-opened demand of Germany, France, and other countries affected by the war for our goods. By Midsummer, 1871, the activity was generally extended, and from that time to the close of the year there was a continuous ascent of prices of various commodities, chiefly raw materials, in the demand for all sorts of labour, and in the quoted value of railways and other enterprises contributing to the business of production. At this date the value of best bar iron was 8l. 17s. 6d. a ton, showing a rise of 24 per cent. on the price of 1870; it is now 6l. 10s.—a fall of 29 per cent., or 5 per cent. less than the price during the war struggle between France and Germany. Copper in 1872 was 95l. a ton—a rise over 1870 of 23 per cent. The price this day is 61l.—a fall of 35 per cent., or just 7 per cent. below the depressed prices of the war. Tin ruled as high as 152l. a ton, showing a rise of only 12 per cent. The price this day of refined is 69l.—a decline of 83l. a ton, or just 130 per cent. of current value, and 54½ per cent. depreciation during the seven years, or 20 per cent. over existing quotations. Lead has fallen from 21l. 15s. a ton in 1872 to 13l. 15s. this day, or 8l. a ton, just 37 per cent. decline during the seven years, and 59 per cent. on current value.

During the years 1871-2 strikes in the metal trades were frequent. They caused great inconvenience, but resulted in advances of from 15 to 20 per cent., with reduction in the hours of labour of from 10 to 15 per cent.—in the case of puddlers the rise was 35 per cent. All these contentions, though temporarily advantageous to workmen, have proved most disastrous to them and the masters. Many of the latter have succumbed with the loss of the whole of their capital. Workmen are full of discontent, and have had to

forego all their enforced advantages. It was in 1872 that the enormous rise in the price of coal throughout England occurred; in the Metropolis to the extent of 100 per cent., and in the colliery districts to 300 per cent. on the previous winter's charges.

It appears to me that the cycle of depression or shrinking of prices of products and commodities has now fallen so far below the normal standard as to be in comparison almost below that of the rampant strides and leaps characterising the expansion of markets during the years 1872-3 and 1874. That a reaction was necessary to check these inflated times is evident to all, as over-productions and false values are as detrimental to the healthy conduct and progress of trade, manufacture, and commerce as depressed quotations far below the normal standard, as at present prevailing, is crippling and disastrous to industries and enterprises, or the profitable employment of money. There is a time to buy as well as to sell, and probably at no period during the past two decades could investors embark more advantageously than at present, for shares in healthy industrial undertakings can be purchased at absurdly low prices, while the floating of bubble companies has had to encounter almost unsurmountable obstacles in the keen discrimination of a disappointed, dissatisfied, and enlightened public. The money loss through repudiation and reduced quotations amounts in gross to a sum equal to the expenditure entailed in the construction of all the railways throughout the United Kingdom. The money has left the country, the foreigner possesses it, and he—

"Chuckles and crows, for the foreigner doth know
No interest for England. Oh! no, no, no."

There is something almost sublime in the "pluck" and "philosophy of opposition" displayed by many Cornishmen in the continued working of their respective mines, and conspicuous among exceptional characters may be named Capt. Wm. Teague and Mr. Boyns. In the year 1872 Tincroft gave 48,000l. in dividends; Carn Brea, 15,500l.; Wheal Owles, 1960l. These mines have since respectively called up 15,000l., 21,375l., and 8392l.; the indebtedness at the recent audits being 9020l., 19,233l., and 19,011l., equal to 30s. a share call in Tincroft, 19l. 5s. a share Carn Brea, and Wheal Owles 237l. 10s. a share. The shares in these mines are chiefly held by Cornish merchants, bankers, and capitalists, and each shareholder is liable for the whole indebtedness, yet working shoulder to shoulder. No one fears default on the part of either, and under the county motto of "One and All" they set an example of esprit and pluck that should inspire confidence in those who adventure in cost-book companies under sound and practical management, and when advocated and supported by local authorities and capitalists. Nil desperandum is the watchword, and perseverance the motto of every true bred miner.

We have from time to time called attention to the Lead Era Mines, and we now direct attention to a detailed report appearing in this day's Journal. The perusal of this report will satisfy the most cautious that the time has arrived for profitable gains to investors.—38, Cornhill, London, June 16.

R. TREDNICK,
Consulting Mining Engineer.

THE SCIENCE OF MINING.

SIR,—In the concluding portion of my last letter on The Science of Mining, I intimated my intention of regarding in this the physical condition of mines. If the rocky shell of our earth is not organic in the sense of animal and vegetable life, it is organic in another and not very dissimilar sense—it is instinct with motion and amenable to laws, and motion is the essence of its being and of its ceasing to be, as in the two other great departments of Nature. There appears to be an interminable and eternal flux in the molecules of matter, whether as affecting the animal, vegetable, or mineral kingdoms, and in each governed and regulated by laws characterised by functions. Laws, operative channels, and producing results, though different in aspect, are similar in design and the modes of their production; therefore, there is an analogy in Nature throughout its three great divisions, and references to either may be apt illustrations of the others. I have for a long period of years been impressed with the similarity of the natural modes (laws) in operation in the three kingdoms of Nature where a similar process is employed. The embryonic animal germ is developed into active life; it is nourished from extraneous ministrations, increases in its growth, and attains the perfection of its organisation, unless previously cut short by accident or disease, when at once commences its decline. The achme, the zenith of its physical perfection, whenever reached, endures but for a moment; its motion is as time. The meridian is no sooner reached than it is passed, and its downward decline is as rapid and in a majority of instances infinitely more so than its ascending progress had been.

Inertia is said to be an attribute of matter, but that can be true only in a comparative sense as applying to the mass, the molecules of which are, nevertheless, subject to active influences and operative agencies, which cause mobility in the several parts, produced and regulated by two opposing forces—attraction and repulsion. All matter obeys these laws with as universal an effect in the mineral as in the animal and vegetable realms of Nature. The great arterial and venous system of the rock shell of our planet become the channels and receptacles of selected minerals and matters, and in some instances undoubtedly from distances indefinitely remote. It is presumable also on sufficiently convincing evidence that these venous channels are the laboratories in which are formed the various ores of commerce and their associated minerals. These ideas, it will be seen, involve the theory of an aqueous circulatory system in connection with the formation of metalliferous and other distinctive minerals, and lead to the conclusion that water as an agent performs the most important part; its activities as a solvent are incessant, extracting from the rocks through which it percolates the ingredients of which lodes are composed, whilst its capacity for absorption, retention, and conveyance of what it subdues unto itself by its own inherent power enables it to convey to the destined fissures the extraneous matters with which it had burdened itself, and there by coming in contact with other forces a chemical change is produced in the molecular condition of the atoms, when their deposition is at once effected. If there is, as is no doubt the case, a constant influx of water to the fissures there must be an equally constant efflux, and all superfluous or unnecessary matters may be borne off by the retreating waters and deposited where their presence is required for entering into other combinations. This venous system of the rocks, together with the nature, character, and general condition of the rocks themselves, constitute the physical features with which the miner is more particularly interested. The relative position of ore-bearing lodes, and I presume of those individually which are not directly productive of ores, to the structure, position, and superposition of the several containing rocks, forming each separate local system is a matter of paramount importance as affecting the quality and productiveness of lodes. These physical features of rocks, courses, slides, and dykes, of whatever nature and kind soever, whether of elvan, porphyry, greenstone, basalt, trachyte, or clay, are all strikingly compatible and in harmony with the aqueous formation of metalliferous minerals. In what relation of value can cross-courses, elvan-courses, or other dykes conceivably stand to lodes unless as channels of conveyance auxiliary to their formation, growth, and productiveness, of which water it is well known is the ever present, current, active agent.

That all mineral substances which have entered into the composition of metalliferous lodes were originally contained in the rocks admits, I think, of but little if any doubt. The metals in some cases, probably in their elementary or atomic condition, in others associated with acids and other mineralising substances upon which the current waters act, changing their condition, and probably during the period intervening between their ingress to and egress from the repository fissures, exchanging solutions and providing material in a twofold sense for new combinations. There is an amount of evidence in favour of this view, in comparison with which that in favour of the igneous theory of the formation of metalliferous minerals passes into utter insignificance.

I reviewed this theory at considerable length in the columns of the Mining Journal six or seven years ago, and, therefore, am not now disposed to go over the same ground again in detail. But whatever may be the theory or theories entertained on this abstruse question,

ROBERT KNAPP.

COED MAWR POOL MINE.

Gardens, London. WILLIAM GABBOTT.

FOREIGN MINING AND METALLURGY.

According to the latest intelligence received from the French metallurgical districts there has been an almost general advance in prices. Notwithstanding this, orders have continued to come to hand; but it is remarked that they have been of rather less importance than in the corresponding period of 1918.

The deposit of anthracite coal in Sonora, California, is beginning to attract considerable attention. The mine is a few miles north of La Barranca and Los Bronces, and the coal is said to be superior to Pennsylvania anthracite, which has been much used on Atlantic steamers. There are three veins of the coal—one 7 ft. thick, another 2½ ft., and the third of unknown thickness. There are also indications of a seam beneath the 7 ft. vein—the one now being worked—of the same or greater thickness. The veins crop out for many miles. It is estimated that the coal may be marketed in San Francisco and the South American ports at \$8 to \$9 per ton, and that it will have great influence in developing manufacturing industry in San Francisco and the interior.

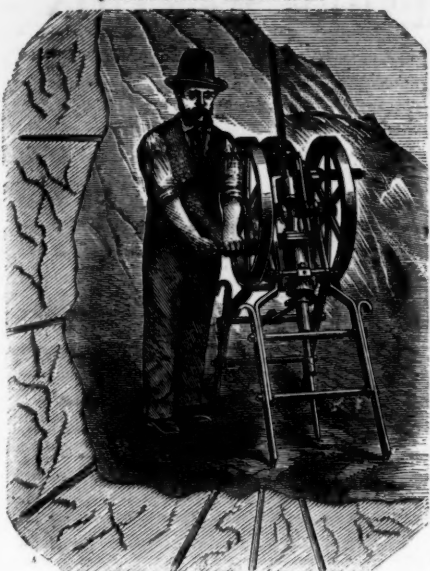
THE SCOTCH MINING SHARE MARKET—WEEKLY REPORT
AND LIST OF PRICES.

under \$40,000.

YOUNG'S PARAFFIN LIGHT AND MINERAL OIL COMPANY (Limited).—At the annual meeting of this company, on Monday, the Chairman said that, although the dividend was less than in the previous year, he yet thought that in depressed times 12½ per cent might be regarded as satisfactory. There had been many adverse matters to contend with, such as deficient water supply and exceptional charges, but the reduction in price of burning oil alone was sufficient to account for the diminished dividend. He explained that Birmingham had been selected for the site of the new lampworks on account of its command of nearly all the material requisite in the construction of lamps. It has also a large population, from which cheap skilled labour can be drawn, and there will be an important saving in railway carriage, from the central position of the town. The company had already been made, which would result in important savings for the current year, and should workmen were maintain their present standard there would be considerable economy therefrom. The exceptional charges would not recur this year, and there would be greater regularity of working, owing to the improved water supply and increased cooling power. On the other hand, the production and stock of crude oil in America are still increasing to an enormous extent, and prices may probably fall again in the current year below even the unprecedented low prices of last year. In view of this, he thought it fortunate that the company had so much in hand, and that the price of burning oils than they were at of late. The shareholders might be satisfied that if lower prices have to be met

PREPARING METAL SHEETS AND WIRE FOR COATING.—A special improved process of treating metal previously to its being coated with tin, lead, or zinc, has been invented by Mr. C. CONWAY, Pontnewydd, near Newport. The present method is to subject the iron, steel, or other metal to a bath of sulphuric acid, but Mr. Conway's invention does away with the use of acid and substitute carbon or hydrocarbon, either in the form of vegetable or mineral tar or hydrocarbons, which may be applied mechanically or by manual labour, but he finds it advantageous to employ a machine by which the plate are by means of rollers passed through a bath containing the carbon to be used, thus doing away with what is technically known as "black pickling" in the manufacture of tin andterne plates. After passing through the bath the plates of metal of other forms go through the usual process of annealing, cold rolling, white pickling, and tinning, as is well understood.

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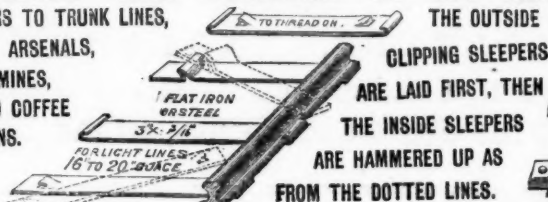
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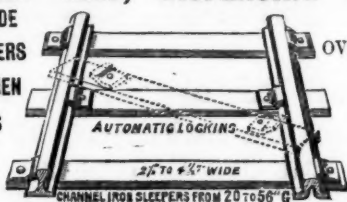
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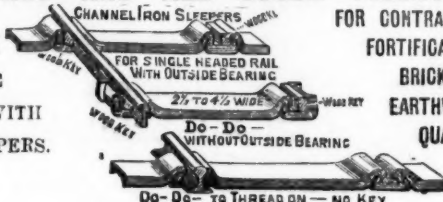
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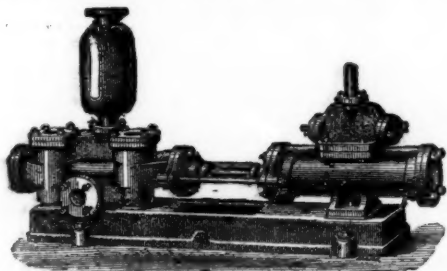
Engineers, Millwrights, Ironfounders, Coppermiths, and Boiler Makers.

SOLE MANUFACTURERS OF

IMPROVED VERTICAL COLEBROOK'S PATENT STEAM PUMP. TORKINGTON AND HEY'S

DOUBLE-ACTING
STEAM PUMPS,

MADE IN ALL SIZES AND
COMBINATIONS.



PRICES OF A FEW LEADING SIZES.

Steam cylinder.	Water cylinder.	Stroke.	Gallons per hour.	Price.
3	1 1/2	12	720	£16
4	2	18	1,260	19
4	4	18	5,040	25
6	4	18	4,280	33
6	6	18	9,660	41
8	6	18	7,920	50
10	8	18	12,060	80

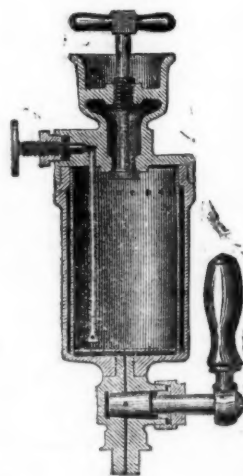
Reliable and Economical—Short Pistons and Long Strokes—Slide Valve worked by Steam alone, without Tappets, Levers, or Valves.

Adapted for all purposes and to all circumstances.

TORKINGTON & HEY'S PATENT LUBRICATORS,

Entirely Self-acting. Flow of Grease regulated
by the Steam. Perfect Lubrication.
Greatest possible Economy.

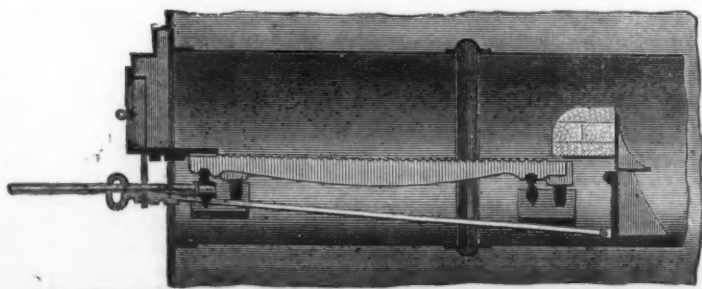
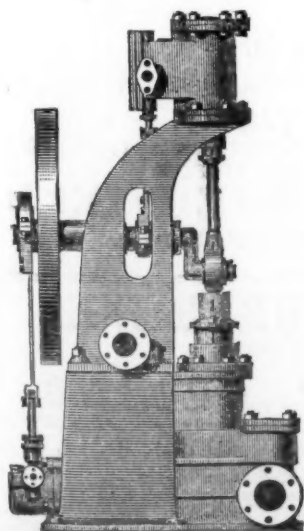
PATENT.



PRICES OF LUBRICATORS.

No.	Horse-power.	Price.
1	Agricultural	7s. 6d.
2	Engines...	10 0
3	5 to 7	20 0
4	7 to 10	25 0
5	10 to 20	30 0
6	20 to 30	37 6
7	30 to 50	47 6
8	50 to 70	60 0
9	70 to 100	85 0
10	100 to 200	110 0

PRICES ON APPLICATION.



IMPROVED SMOKE PREVENTING FIRE BARS.

TO SUIT ANY
FLUE
OR
FURNACE.
—
PRICES
ON
APPLICATION.

At the PARIS EXHIBITION the Jurors have Awarded
THE GOLD MEDAL, THE SILVER MEDAL, AND HONOURABLE MENTION
 FOR MY LATEST PATENTED STONE BREAKERS AND ORE CRUSHERS.

H. R. MARSDEN,
 ORIGINAL PATENTEE AND SOLE MAKER OF BLAKE'S

Improved Patent Stone Breakers & Ore Crushers.

New Patent Reversible Jaws,
 in Sections, with Patent
 Faced Backs.

NEW PATENT ADJUSTABLE
 TOGGLES.

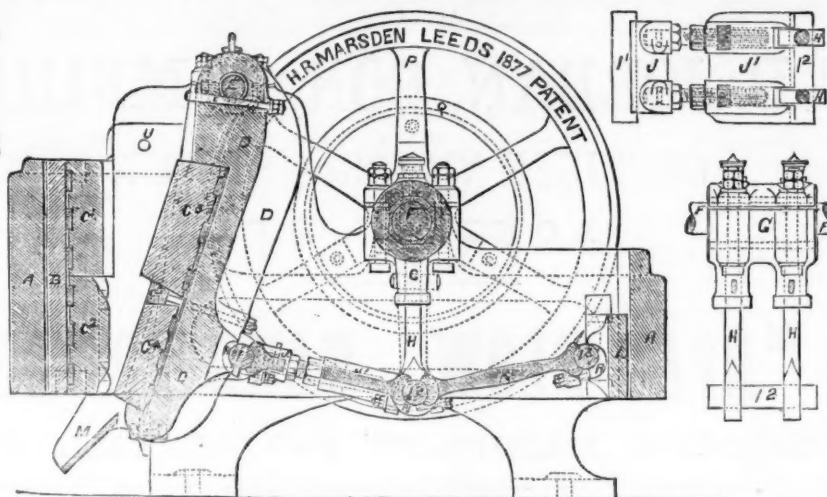
OVER 2500 IN USE.

New Patent Draw-back
 Motion.

NEW PATENT STEEL TOGGLE BEARINGS.

70

PRIZE MEDALS.



READ THIS—

Wharfedale Lime Works, Maryport, Whitehaven,
 November 7, 1878.

H. E. MARSDEN, Esq., Soho Foundry, Meadow-lane, Leeds.
 DEAR SIR,—The machine I have in use is one of the large
 size, 24 in. by 12 in. The quantity we are breaking daily with
 this one machine is 250 tons, the jaw being set to break to a
 size of 2½ in. We have, however, frequently broken over
 300 tons per day of ten hours, and on several occasions over
 350 tons during the same period. The stone we break is the
 blue mountain limestone, and is used as a flux in the various
 ironworks in this district. We have now had this machine in
 daily use for over two years without repairs of any kind, and
 have never had occasion to complain of any inconvenience in
 using the machine. I hope the one you are now making for
 me may do its work equally well. The cost—including EN-
 GINE-POWER, COALS, ENGINEMAN, FEEDING, and all EXPENSES
 OF EVERY KIND—is just 3d. per ton. Should any of your
 friends feel desirous of seeing one of your machines at work,
 I shall have much pleasure in showing the one alluded to.

I am, dear Sir, yours very truly,
 WILLIAM MILLER.

AND THIS—

Wharfedale Lime Works, Aspatia, Cumberland,
 July 11th, 1878.

H. R. MARSDEN, Esq., Soho Foundry, Leeds.
 DEAR SIR,—We are in receipt of your letter of 4th inst. I
 may just state that the stone breaker above named has been
 under my personal superintendence since its erection, and I
 have no hesitation in saying that it is as good now as it was
 five years ago.

I am, dear Sir, yours faithfully,
 FRANCIS GOULD.

GREATLY REDUCED PRICES ON APPLICATION.

ALL BEARINGS are renewable, and made of H.R.M.'s Patent Compound ANTIFRICTION METAL.

CATALOGUES, TESTIMONIALS, &c.

H. R. MARSDEN, SOHO FOUNDRY, LEEDS, ENGLAND.

Royal Agricultural Society's International Exhibition, Kilburn, London—JUNE 30 TO JULY 7 INCLUSIVE. STAND 457.

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 and Ore Crushers.

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SUPPLY their CELEBRATED ROCK DRILLS, AIR COM-
 PRESSORS, &c., and all NECESSARY APPLIANCES for
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 KNOWN ROCK in numerous mines in Great Britain and
 other countries, clearly proving their DURABILITY and
 POWER.

The DRILLS are exceedingly STRONG, LIGHT, SIMPLE,
 and adapted for ends, stopes, quarries, and the sinking of
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 Economical Working, apply to—

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 LISKEARD, CORNWALL.

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 CHARGE IN



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 FIRE TO THE
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 the "INTERNATIONAL EXHIBITION" of 1862 and 1874, in London; at the
 "IMPERIAL EXHIBITION," held in Paris, in 1865; at the "INTERNA-
 TIONAL EXHIBITION," in Dublin, 1865; at the "UNIVERSAL EXPOSI-
 TION," in Paris, 1867; at the "GREAT INDUSTRIAL EXHIBITION," at At-
 tona, in 1869; TWO MEDALS at the "UNIVERSAL EXHIBITION," Vienna,
 in 1873; and at the "EXPOSICION NACIONAL ARGENTINA," Cordeva,
 South America, 1872.



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 BANK CHAMBERS, SOUTH JOHN-STREET, LIVER-
 POOL; and 85, GRACECHURCH-STREET, LONDON,
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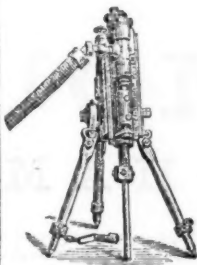
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Air-Compressing Machinery,

Simple, strong, and giving most excellent results, and

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